Aviation Protective Equipment

Introduction

Proper wear and maintenance of aviation equipment while serving as an aircrew member will help reduce injuries and possibly save your life should you be involved in an aircraft accident.

This lesson will review the proper use of aviation protective equipment. You will be able to maintain and wear this equipment in accordance with (IAW) the appropriate Army Regulations and Technical Manuals. Use these instructions as a self-checklist every time you wear flight equipment.

After completing this lesson…

You will be able to:	You will be able to discuss:
• Discuss the use and care of aviation life support equipment in flight and the potential protections they provide • Identify the safety features provided by an aircraft • Identify the characteristics and wear of flight clothing	• The maintenance procedures for flight clothing. • Apparel that is safe and unsafe for air crewmembers

Aircraft Safety Features

Aircraft safety features:

Aircraft structural shell (fuselage)	Landing gear and crashworthy seats	Personnel restraint system	Post-crash factors
Cockpit and cabin: possess sufficient strength to prevent intrusion of structure in occupied spaces during a survivable crash. Floor and nose: designed to reduces plowing or	Newer Army rotary wing aircraft (UH-60/AH-64) rely heavily on fixed landing gear and seats to attenuate crash forces. Fatalities are rare for vertical impacts up to approximately 15.2 meters per	To survive an impact, only to then be injured or killed due to ejection from the aircraft would be terrible. Studies indicate that contact injuries (secondary impacts) occur 5 times as often as	Protection from thermal injuries: - Crashworthy fuel systems - Self sealing fuel cells - Break free self sealing fuel lines - Fire extinguishing systems in the engine compartment

scooping of earth during crashes, which could decrease stopping distances resulting in higher decelerative forces.	second (50 ft/sec). Maximum landing loads for the UH-60 is 540 ft/min (11.25g) under normal conditions.	acceleration injuries. Therefore personal restraints should be tight as to inhibit contact with objects in the cockpit, i.e. cyclic. Equipment should also be tied-down securely to prevent being thrown into crewmembers.	- personal fire extinguishers in the cockpit (for personnel). Protection from drowning: - training of the crewmember (water survival training) - Special equipment (required during overwater missions): -- personal flotation devices (water wings) -- rafts.

Fight Apparel

Why is it important to wear flight clothing properly?

- Proper wear of all aviation life support equipment must be established before the flight begins. If an emergency occurs the crewmember may either be too busy or have insufficient time to make corrective changes (especially if the aircraft is at a low altitude as in nap-of-the-earth flight).
- AR 95-1 states: "The following U.S. Army approved clothing and equipment will be worn by all crew members when performing crew duties: leather boots, flight helmet, flight suit, flight gloves, cotton, wool, or NOMEX underwear, and identification tags".
- A functional aviation protective equipment ensemble is determined not only by proper care and maintenance techniques, but also by proper wear of the equipment.

Wearing Flight Apparel

How to wear flight clothing properly: about NOMEX

Undergarments	**NOMEX flight suits**	**Identification tags**	**Boots**	**NOMEX flight gloves**	**Flight helmets**

Wear cotton, wool or NOMEX underwear when performing crew duties per AR 95-1.

WARNING: Nylon or other synthetic underwear will melt underneath the NOMEX, and cause life-threatening burns to the trunk and groin.

Most synthetic underwear fabrics melt at or below 350 degrees and ignite at 450 degrees and above!

NOMEX is not fireproof and will char at about 700 degrees to 800 degrees F (370 degrees to 430 degrees C); therefore, proper ground egress procedures cannot be over emphasized.

Improper use of these garments can produce

NOMEX flight suits (either the one piece, sage green or the Aviation Battle Dress Uniform) are flame resistant garments. The flame resistant properties are inherent of the polymer chemistry; it will not diminish during the life of the fiber. This flexible polymer chain gives NOMEX more textile-like qualities while retaining high temperature properties similar to KEVLAR.

Collar is one piece, which is worn up while flying

Required when flying.

Avoid plastic covers/liners that could cause burns if the plastic melts.

ID tag chain should be worn around outside of collar and tucked between blouse and T-shirt.

Retention during high G-forces to include crash or ejection. Stability to prevent ankle and foot injury that could compromise aircraft escape.

Fire retardancy of leather boots is greater than jungle boots.The boots must be laced up fully to the top

WARNING: Avoid boots with zippers, straps, and jungle boots. Zippers will transfer heat, straps will give or even break and jungle boots will melt.

Flight gloves are designed for comfort, insulation during a fire, and sensitivity to identify an object by touch.

Flight Gloves must be worn at all times during flight or when engaged in flight activities.

Gloves are to be worn under the sleeves of the NOMEX flight suit. If a watch is worn, it should be worn outside of glove.

WARNINGS: When donning the helmet, ensure that the nape strap pad is completely pulled down and that the keeper tab is taut. Failure to do so will decrease helmet stability and may cause injury to the wearer.

Always wear the helmet with the chinstrap properly attached and adjusted. Failure to secure the chinstrap will decrease helmet stability and may cause injury to the wearer.

Laser-protective visors are not intended to protect against broad-spectrum bright light. Do not use the laser-protective visors to view solar eclipses, electric welding equipment, or other

heat exhaustion within thirty minutes of hard work.

CAUTION: Burns to the neck can occur during a flash fire if the collar is not worn up!

Sleeves must be worn down and Velcro tabs secured during flight.

CAUTION: Sleeves must be long enough to compensate for reach. The wrist must remain covered even when the arm is extended, to avoid injury from flash fires or flames!

Uniform should be loose fitting to prevent thermal burns due to tightness. Size and fit should

potentially eye-damaging light sources.

Proper fitting is essential to the effectiveness of the helmet, all of its modules, and consequently, the safety of the operator/wearer.

CAUTIONS: Do not store helmet in a closed cockpit, an automobile, or any other area where temperatures can exceed 200 degrees on an 85 degree day. Excessive heat will damage the thermoplastic liner (TPL).

When donning or removing helmet, spread helmet just enough to clear head. Excessive spreading may damage helmet.

completely cover all skin not covered by gloves, helmet and boots. Best protection is provided by two layers of clothing (NOMEX over NOMEX, cotton, or wool).

CAUTION: Pant legs should not rise above top of boot when sitting, to avoid injury from flash fires or flames!

Flight Helmet

Flight Helmets

Sound Protective Helmet-4B (SPH4B)	Head Gear Unit-56P	How to Wear Flight Helmets:
Provides both crash protection and noise attenuation. Superior to all preceding helmets. Custom fit by local	Replacement for the SPH-4B. Constructed of graphite and SPECTRA®--a thicker, less dense, energy absorbing liner. This helmet provides greater	Use visor except during night vision goggle flights or when using target acquisition equipment. Visors are available and the majority of crewmembers state they

aviation life support equipment (ALSE) technician by heating or removing thermal plastic liners (TPL). Dual visor provides eye and face protection day or night. Designed to provide better retention if the chinstrap and nape strap are tight.	impact protection than previous helmets. Also has an upgraded retention system. Sound attenuation better than SPH-4B. Custom fitted by an ALSE technician. Dual visors, comparable to the SPH-4B, and detachable face guard. Chin and nape pad/strap for better retention. Always ensure both are tight prior to flight. Platform of the future for all aviation headgear.	are satisfied with them, and using them. Still visors were found in the up position in the majority of helmets retrieved. Always ensure both chin and nape straps are tight prior to flight.

Clothing Maintenance

Flight Clothing Maintenance Procedures

- Avoid wearing flight suit during routine ground duties due to possible contact with grease, oil, paint, glue, and other combustible materials.
- Reduces fire retardancy.
- Reduces breathing qualities of the garment.

Cleaning Flight Suits	Washing NOMEX Flight Gloves	Washing Flight Helmets (SPH-4B and HGU-56P)
Wash at temperatures less than 180o, and rinse completely to remove soap film. Fabric softeners may be used in the rinse cycle to remove body oils. The fabric softeners will also	NOMEX flight gloves can be washed with mild soap and water while gloves are on your hands, or in a washer. **NOTE:** Wash only when necessary. Washing temperature	Clean outer helmet and visors with warm soapy water and soft cloth. Remove the TPL to clean the liner. Modifications may be made only by ALSE technicians.

serve to inhibit static generation.
Do not use any type of bleaching compound in laundering
Do not starch. In the event that the uniform is inadvertently starched, restore the fire resistance to its original state by rinsing the garment in warm water.
Drying temperature should not exceed 180 degrees.
Ironing on the Permanent Press setting, medium temperature, can be done, but do not iron the Velcro tabs. Wrinkles, however, are hard to remove from NOMEX due to its high temperature resistant quality.
Commercial dry cleaning may be used.
The jackets and hood should be commercially dry cleaned only.

should not exceed 120 degrees. Do not bleach or starch.
Remove excess water by squeezing gloves or rolling them in towel. Do not wring or twist. Stretch gloves into shape and hang or lay flat to air dry. Do not tumble dry, or expose wet gloves to heat or direct sunlight.
NOTE: It is the crewmembers responsibility to directly exchange (DX) these items when material is worn, ripped, or damaged.

Inspect helmet, each time it is used, for loose or worn parts, frayed straps, and cracking of the outer shell.
Do not sit on helmet.
Do not place objects in the helmet that can damage the protective qualities of polystyrene lining and TPL.

Unsafe Apparel

Examples of unsafe apparel for air crewmembers:

- Metal jewelry and watches can be dangerous when working on the aircraft, near battery terminals, or exposed wiring connection.
- **NOTE:** If you wear a watch, wear it over the gloved hand.
- Metal insignia can contribute to injuries during a crash sequence or due to electrical short circuits. Foreign objects damage can be caused by the fastener on back of the insignia. Insignia and badges on ABDUs will be sewn on.
- Issued sunglasses are for use during the day when night flight is anticipated. Glasses are not a substitute for visors.
- **WARNING:** Use of sunglasses does not substitute for visor during flight.